

## ENGINEERED T CELLS TARGETING TUMOR-SPECIFIC MUTATIONS

### SUMMARY

The National Cancer Institute's Surgery Branch seeks partners interested in collaborative research to co-develop or license T-cell receptors reactive with tumor associated antigens.

### REFERENCE NUMBER

E-229-2014

### PRODUCT TYPE

- Research Materials
- Therapeutics

### KEYWORDS

- T-cell receptor, TCR

### COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

### CONTACT

Steven A. Rosenberg  
NCI - National Cancer Institute  
301.496.4164

[sar@mail.nih.gov](mailto:sar@mail.nih.gov)

### DESCRIPTION OF TECHNOLOGY

Scientists at the National Cancer Institute's [Surgery Branch](#) have developed a method to identify and generate T-cell receptor (TCR) engineered T- cells for personalized cancer therapy. The TCR is a complex of integral membrane proteins that recognizes antigens and activates T cells. Human cancers contain genetic mutations that are unique in each patient. The researchers found cancer-specific mutations by sequencing tumors and comparing with normal cells. Using tandem minigene constructs encoding all of the patient's tumor mutations, they first identified T cells that were reactive with the unique mutated antigens expressed only in the patient's tumors. Next, they isolated the mutation-reactive TCRs and engineered peripheral blood T cells from the same patient to express these mutation-reactive TCRs. These personalized TCR engineered T cells can be expanded and infused back into the same patient with the potential to induce tumor regression.

### POTENTIAL COMMERCIAL APPLICATIONS

- Personalized immunotherapy to treat primary and recurrent epithelial cancer.

- A research tool to identify patient-specific immunogenic mutations in tumors.
- A research tool to identify and isolate mutation-specific T cell receptors.

## COMPETITIVE ADVANTAGES

- This patient-specific therapy has the potential application to most epithelial cancers, which account for about 90% of cancer deaths in the United States.
- Personalized TCR engineered T cells target tumor cells and spare normal tissues. This therapy has no tissue toxicities comparing to traditional chemotherapy and radiotherapy.
- The infusion of a highly pure population of these T cells expressing mutation-specific TCRs may maximize therapy and result in regression of all target lesions.

## INVENTOR(S)

Eric Tran (NCI), Yong-Chen W. Lu (NCI), Paul F. Robbins (NCI), [Steven A. Rosenberg](#) (NCI)

## DEVELOPMENT STAGE

- Pre-clinical (in vivo)

## PUBLICATIONS

Tran E, et al. [PMID 24812403]; Robbins P, et al. [PMID 23644516]; Tran E, et al. [PMID 25046408]; Gros A, et al. [PMID 24667641]

## PATENT STATUS

- **U.S. Filed:** PCT Application No. PCT/US2014/058796 filed October 2, 2014

## THERAPEUTIC AREA

- Cancer/Neoplasm